

Marine Molluscan Fauna of Jindo Island

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ABSTRACT

As a part of the commemorative joint faunal survey for the 30th anniversary of the Korean Society of Systematic Zoology, the molluscan fauna of Jindo Island was investigated based on sample collection from 6 localities from the 6 to the 8 of Jul 2016. A total of 114 molluscan species from 47 families were collected and identified. Among these, 42 species from 11 families are newly reported from Jindo Island and combining the previous records with the present study totals 157 species from 57 families. Distribution of species records indicates that marine biogeography of Jindo Island represent an overlapping zone for marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters.

Keywords: molluscan fauna, Jindo Island, Korea, biodiversity, overlapping zone

INTRODUCTION

Jindo Island is the third largest island in Korea after Jeju-do and Geojeo Islands. It is located on the boundary of the Yellow sea and southern sea of the Korean peninsula. For this reason Jindo Island is known to be biogeographically important region and maintain high biodiversity for marine organisms (Kim and Kwon, 1983; Kil et al., 2005). In previous surveys for molluscan fauna of Jindo Island, 117 species from 45 families have been recorded (Kim and Kwon, 1983; Choe, 1992, 2000, 2002a, 2002b; Choe and Park, 1993, 1997; Yum, 1995; Choe et al., 1999; Kil et al., 2005). Most of the previous studies except for Kim and Kwon (1983) and Kil et al. (2005) were conducted as part of a survey of the natural environment or as part of a study of specific molluscan taxonomic groups. In both Kim and Kwon (1983) and Kil et al. (2005), comprehensive surveys of the molluscan fauna of Jindo Island were performed. Those two studies suggested that the Jindo Island waters are an overlapping zone of marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters. This work was part of a joint survey of the invertebrate fauna of Jindo Island to commemorate the 30th anniversary of the

Korean Society of Systematic Zoology. The present study reports comprehensive survey of molluscan fauna of Jindo Island by comparison of the previous records with current data information in species composition.

MATERIALS AND METHODS

Samples of marine mollusks were collected in 6 localities which included 20 survey locations from the 6 to the 8 of Jul 2016 (Fig. 1). Specimens were mostly collected from intertidal zones at low-water sea levels. Samples were preserved in 95% ethyl alcohol or in 10% neutral formalin before the morphological examination. Species identification of the specimens was performed with a stereoscopic microscope (Leica M205C; Leica, Wetzlar, Germany) (Okutani, 2000; Min et al., 2004). All specimens are deposited in the Marine Mollusk Resource Bank of Korea (MMRBK).

RESULTS AND DISCUSSION

A total of 114 molluscan species from 47 families were col-

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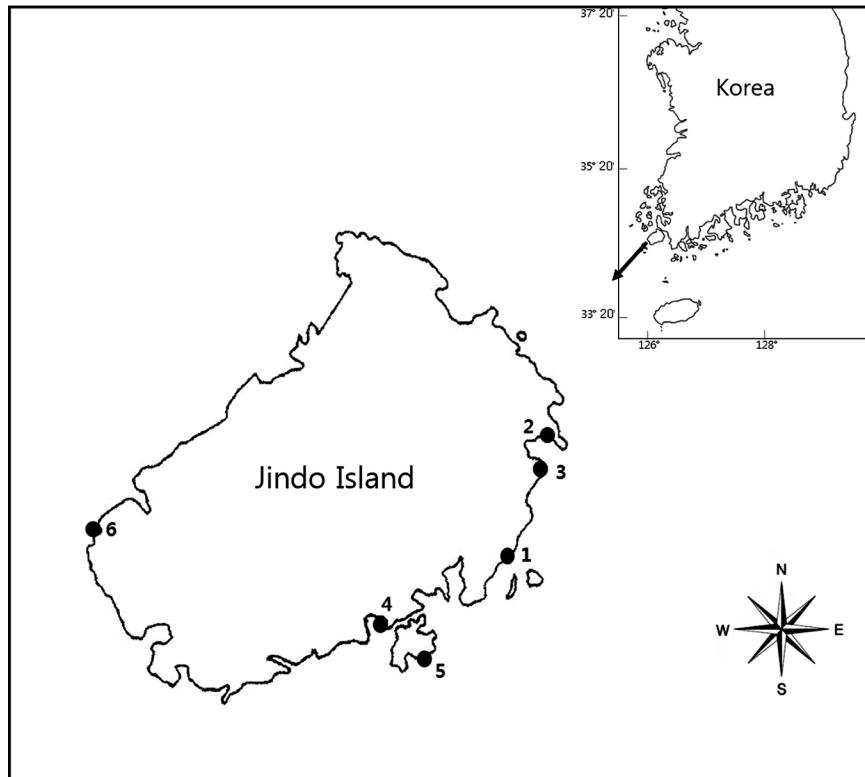


Fig. 1. Map showing the collection localities. 1, Gagye; 2, Wonpo; 3, Beolpo; 4, Geumgap beach; 5, Jeopdo Isand; 6, Gahak.

lected and identified during this investigation. Among these, 42 species from 11 families are those newly reported in this survey. We confirmed 72 of the 117 species that were listed in previous reports, including *Onchidella kurodai* (Taki, 1935). If the present data is combined with previous records, a total of 157 molluscan species from 57 families have been recorded from the Jindo Island (Table 1). Endangered species and legally protected species such as natural monuments were not found in this study.

The intertidal zones of the Jindo Island area consist mostly of mixed rocks, sand, and mud, and provide a habitat for a variety of marine organisms. Some of the discovered molluscan species (*Lottia luchuana* (Pilsbry, 1901), *Bittium glareosum* Gould, 1861, *Macroschisma dilatatum* A. Adams, 1851, *Cantharidus callichroa* (Philippi, 1850), *Cantharidus hirasei* Pilsbry, 1901, *Homalopoma sangarense* (Schrenck, 1861), *Bostrycapulus gravispinosus* (Kuroda & Habe, 1950), *Lataxiella fimbriata* (Hinds, 1844), *Hyotissa chemnitzi* (Hanley, 1846), *Kellia porculus* Pilsbry, 1904) from Jindo Island area are also recorded from Jejudo Island, the southern part of Korean waters, and even the Eastern Sea. Thus, the Jindo Island shows a distinct biogeographic pattern that contains marine molluscan species from both the Yellow sea and the

South Sea of Korea; this demonstrates that from a biogeographical point of view, the Jindo Island area is an overlapping zone for marine organisms which dwell in the Yellow sea and the southern sea areas of Korean waters. Furthermore, this area is located where the Kuroshio warm current, flowing from the South China Sea, splits into two branches along the western coast and southern coast of the Korean peninsula. This hydrography influences regional biogeography of Jindo Island that is characterized by an assemblage of both western and southern malacofauna of Korean waters. Therefore, conservation efforts for the marine ecosystem and marine invertebrates in Jindo Island area is important for protecting the diversity and distribution of marine invertebrate in Korean waters.

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Table 1. Comparing this investigation and previous investigation

| Class | Family | Species | Reference ^a | Previous studies | Present study |
|------------------------------------|--|---|------------------------|------------------|---------------|
| Polyplacophora Blainville, 1816 | Ischnochitonidae Dall, 1889 | <i>Ischnochiton boninensis</i> Bergenhayn, 1933 | 8, 9 | — | • |
| | | <i>Ischnochiton comptus</i> (Gould, 1859) | 8, 9 | • | • |
| | | <i>Ischnochiton</i> sp. | 1 | — | — |
| | Mopaliidae Dall, 1889 | <i>Lepidozoa coreanica</i> (Reeve, 1847) | 1, 8, 9 | — | — |
| | | <i>Mopalia retifera</i> Thiele, 1909 | — | — | — |
| | | <i>Placiphorella stimpsoni</i> (Gould, 1859) | 9 | — | — |
| | Chitonidae Rafinesque, 1815 | <i>Chiton kurodai</i> Is. & Iw. Taki, 1929 | 4, 8, 9 | — | — |
| | | <i>Liolophra japonica</i> (Lischke, 1873) | 1, 8, 9 | — | — |
| | Acanthochitonidae Pilsbry, 1893 | <i>Acanthochitona achates</i> (Gould, 1859) | 8, 9 | — | — |
| | | <i>Acanthochitona circellata</i> A. Adams & Reeve MS, Reeve, 1847 | 4 | — | — |
| | | <i>Acanthochitona defilippi</i> (Tapparone Canefri, 1874) | 1, 4 | — | — |
| | | <i>Acanthochitona rubrolineata</i> (Lischke, 1873) | 1, 4 | — | — |
| | Cryptoplacidae H. Adams & A. Adams, 1858 | <i>Cryptoplax japonica</i> Pilsbry, 1901 | — | — | — |
| | Nacellidae Thiele, 1891 | <i>Cellana grata</i> (Gould, 1859) | 7 | — | — |
| | | <i>Cellana toreuma</i> (Reeve, 1854) | 1, 7, 8, 9 | — | — |
| | Lottiidae Gray, 1840 | <i>Lottia dorsuosa</i> (Gould, 1859) | 1 | — | — |
| | | <i>Lottia kogamogai</i> Sasaki & Okutani, 1994 | 8 | — | — |
| | | <i>Lottia luchuana</i> (Pilsbry, 1901) | — | — | — |
| | | <i>Lottia tenuisculptata</i> Sasaki & Okutani, 1994 | — | — | — |
| | | <i>Nipponacmea concinna</i> (Lischke, 1870) | 1, 8, 9 | — | — |
| | | <i>Nipponacmea fuscoviridis</i> (Teramachi, 1949) | 2, 8, 9 | — | — |
| | | <i>Nipponacmea radula</i> (Kira, 1951) | — | — | — |
| | | <i>Nipponacmea schrenkii</i> (Lischke, 1868) | 1 | — | — |
| | | <i>Niveotectura pallida</i> (Gould, 1859) | 1, 7 | — | — |
| | | <i>Patelloida conulus</i> (Dunker, 1861) | 7, 8, 9 | — | — |
| | | <i>Patelloida pygmaea</i> (Dunker, 1860) | 9 | — | — |
| | | <i>Patelloida saccharina</i> f. <i>lanx</i> (Reeve, 1855) | 7, 8 | — | — |
| | | <i>Haliotis discus</i> Reeve, 1846 | — | — | — |
| | | <i>Macroschisma dilatatum</i> A. Adams, 1851 | 1, 9 | — | — |
| | | <i>Macroschisma sinense</i> A. Adams, 1855 | — | — | — |
| | | <i>Tugali decussata</i> A. Adams, 1852 | — | — | — |
| | | <i>Cantharidus callichroa</i> (Philippi, 1850) | 1, 7, 8 | — | — |
| | | <i>Cantharidus hirasei</i> Pilsbry, 1901 | 9 | — | — |
| | | <i>Cantharidus japonicus</i> (A. Adams, 1853) | 8, 9 | — | — |
| | | <i>Cantharidus urbanus</i> (Gould, 1861) | — | — | — |
| | | <i>Komaitrochus pulcher</i> Kuroda & Iw. Taki, 1958 | 9 | — | — |
| | | <i>Lirularia iridescens</i> (Schrenck, 1863) | — | — | — |
| | | <i>Monodonta australis</i> (Lamarck, 1822) | — | — | — |
| | | <i>Monodonta labio</i> (Linnaeus, 1758) | — | — | — |
| | | <i>Monodonta labio confusa</i> Tapparone Canefri, 1874 | 1, 6 | — | — |
| | | <i>Monodonta perplexa</i> Pilsbry, 1889 | 7, 8, 9 | — | — |
| | | <i>Umbonium costatum</i> (Kiener, 1839) | 1, 6 | — | — |
| | | <i>Umbonium thomasi</i> (Crosse, 1863) | 1 | — | — |

Table 1. Continued

| Class | Family | Species | Previous studies | | Present study |
|----------------------------|--------------------------------------|---|------------------------|-------------------|---------------|
| | | | Reference ^a | Kil et al. (2005) | |
| Gastropoda Cuvier, 1797 | Tegulidae Kuroda, Habe & Oyama, 1971 | <i>Chlorostoma lischkei</i> (Tapparone Canefri, 1874) <i>Chlorostoma turbinatum</i> (A. Adams, 1853) | 7, 8, 9 | • | • • • |
| | | <i>Chlorostoma xanthostigma</i> A. Adams, 1853 | — | — | — |
| | | <i>Omphalius nigerrimus</i> (Gmelin, 1791) | — | — | — |
| | | <i>Omphalius rusticus</i> (Gmelin, 1791) | 1 | • | — |
| | | <i>Granata lyra</i> (Pilsbry, 1890) | 7, 8, 9 | — | — |
| | | <i>Calliostoma consors</i> (Lischke, 1872) | — | — | — |
| | | <i>Calliostoma unicum</i> (Dunker, 1860) | — | — | — |
| | | <i>Bothropoma pilula</i> (Dunker, 1860) | — | — | — |
| | | <i>Homalopoma amussatum</i> (Gould, 1861) | 8 | — | — |
| | | <i>Homalopoma sangarensis</i> (Schrenck, 1861) | — | — | — |
| | | <i>Lunella correensis</i> (Récluz, 1853) | 1, 2, 7, 8, 9 | — | — |
| | | <i>Nerita japonica</i> Dunker, 1860 | — | — | — |
| | | <i>Bittium glareosum</i> Gould, 1861 | 7 | 1, 7, 8 | — |
| | | <i>Rhinoclavis kochi</i> (Philippi, 1848) | — | 3 | — |
| | | <i>Batillaria cumingii</i> (Crosse, 1862) | — | 1, 2 | — |
| | | <i>Batillaria multiformis</i> (Lischke, 1869) | — | 1, 2, 6, 8 | — |
| | | <i>Cerithideopsis cingulata</i> (Gmelin, 1791) | 2, 6 | — | — |
| | | <i>Cerithideopsis incisa</i> (Hombroch & Jacquinot, 1848) | — | — | — |
| | | <i>Epitonium japonicum</i> (Dunker, 1861) | — | — | — |
| | | <i>Echinolittorina radiata</i> (Souleyet, 1852) | — | — | — |
| | | <i>Littoraria articulata</i> (Philippi, 1846) | — | — | — |
| | | <i>Littoraria scabra</i> (Linnaeus, 1758) | — | — | — |
| | | <i>Littorina brevicula</i> (Philippi, 1844) | — | — | — |
| | | <i>Barleeria trifasciata</i> Habe, 1960 | — | — | — |
| | | <i>Cheilea cepacea</i> (Broderip, 1834) | — | — | — |
| | | <i>Sabia conica</i> (Schumacher, 1817) | — | — | — |
| | | <i>Bostrycapulus gravispinosus</i> (Kuroda & Habe, 1950) | — | — | — |
| | | <i>Crepidula onyx</i> G. B. Sowerby I, 1824 | — | — | — |
| | | <i>Ergaea walshi</i> (Reeve, 1859) | — | — | — |
| | | <i>Thylacodes adamsii</i> (Mörch, 1859) | — | — | — |
| | | <i>Laguncula pulchella</i> Benson, 1842 | — | — | — |
| | | <i>Neverita didyma</i> (Röding, 1798) | — | — | — |
| | | <i>Assiminea estuarina</i> Have, 1946 | — | — | — |
| | | <i>Paludinelllassiminea japonica</i> (Pilsbry, 1901) | — | — | — |
| | | <i>Ceratostoma burnetti</i> (Adams & Reeve, 1849) | — | — | — |
| | | <i>Ceratostoma toriflum</i> (Adams & Reeve, 1849) | — | — | — |
| | | <i>Lataxiena fimbriata</i> (Hinds, 1844) | — | — | — |
| | | <i>Ocenebra inornata</i> (Récluz, 1851) | — | — | — |
| | | <i>Pteropurpura falcata</i> (G. B. Sowerby II, 1834) | — | — | — |
| | | <i>Rapana venosa</i> (Valenciennes, 1846) | — | — | — |
| | | <i>Reishia bronni</i> (Dunker, 1860) | — | — | — |
| | | <i>Reishia clavigera</i> (Küster, 1860) | — | — | — |
| | | | 1, 8, 9 | — | — |

Table 1. Continued

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| Class | Family | Species | Present study | |
|----------------------------------|-----------------------------|--|------------------------|-------------------|
| | | | Reference ^a | KIL et al. (2005) |
| Bivalvia Linnaeus, 1758 | Mytilidae Rafinesque, 1815 | <i>Septifer virgatus</i> (Wiegmann, 1837) <i>Xenostrobus atratus</i> (Lischke, 1871) | 1, 7, 8 7, 8 | • • |
| | Pectinidae Rafinesque, 1815 | <i>Chlamys farrei farrei</i> (Jones & Preston, 1904) <i>Chlamys farrei nipponensis</i> (Kuroda, 1932) | — — | • • |
| | | <i>Chlamys irregularis</i> (G. B. Sowerby II, 1842) | 1 | — |
| Anomiidae Rafinesque, 1815 | | <i>Scaeochlamys squamata</i> (Gmelin, 1791) <i>Anomia chinensis</i> Philippi, 1849 | 7 — | — — |
| Gryphaeidae Vialov, 1936 | | <i>Pododesmus macrochisma</i> (Deshayes, 1839) <i>Hyotissa chemnitzi</i> (Hanley, 1846) | 7 — | • — |
| Ostreidae Rafinesque, 1815 | | <i>Crassostrea gigas</i> (Thunberg, 1793) <i>Ostrea denselamellosa</i> Lischke, 1869 | 1, 7, 8 — | • — |
| Galeommatidae Gray, 1840 | | <i>Saccostrea kegaki</i> Torigoe & Inaba, 1981 | — | • |
| Lasaeidae Gray, 1842 | | <i>Striostrea circumpecta</i> (Pilsbry, 1904) <i>Pseudogaleomma japonica</i> (A. Adams, 1862) | — — | — — |
| Kelliidae Forbes & Hanley, 1844 | | <i>Lasaea undulata</i> (A. A. Gould, 1861) <i>Kellia porculus</i> Pilsbry, 1904 | 7 — | • — |
| Mactridae Lamarck, 1809 | | <i>Macra quadrangularis</i> Reeve, 1854 | — | • |
| Trapezidae Lamy, 1920 (1895) | | <i>Neotrapexium liratum</i> (Reeve, 1843) <i>Clementia papyracea</i> (Gmelin, 1791) | — — | • — |
| Veneridae Rafinesque, 1815 | | <i>Cyclina sinensis</i> (Gmelin, 1791) <i>Dosinia corrugata</i> (Reeve, 1850) | 6 — | • — |
| | | <i>Macridiscus aequilatera</i> (G. B. Sowerby I, 1825) <i>Ruditapes philippinarum</i> (Adams & Reeve, 1850) | 1, 6 — | • — |
| Glauconomidae Gray, 1853 | | <i>Glaucomeone chinensis</i> Gray, 1828 | 1 | — |
| Carditidae Féussac, 1822 | | <i>Cardita leana</i> Dunker, 1860 | — | — |
| Laternulidae Hedley, 1918 (1840) | | <i>Laternula anatina</i> (Linnaeus, 1758) | 7, 9 — | — — |
| Loliginidae Lesueur, 1821 | | <i>Loligo (Nipponoligo) beka</i> (Sasaki, 1929) | 1 | — |
| Octopodidae d'Orbigny, 1840 | | <i>Octopus minor</i> (Sasaki, 1920) | — — | • — |
| Cephalopoda Cuvier, 1797 | | | | |

^{a1} Kim and Kwon (1983); 2, Choe (1992); 3, Choe and Park (1993); 4, Yum (1995); 5, Choe and Park (1997); 6, Choe et al. (1999); 7, Choe (2000); 8, Choe (2002a); 9, Choe (2002b).

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